Illinois Levee Summit

Illinois Levee Systems

by

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Flood Risk Management

- Levees
- Reservoirs
- Floodplain Policy
- Communication of Risk
- FEMA

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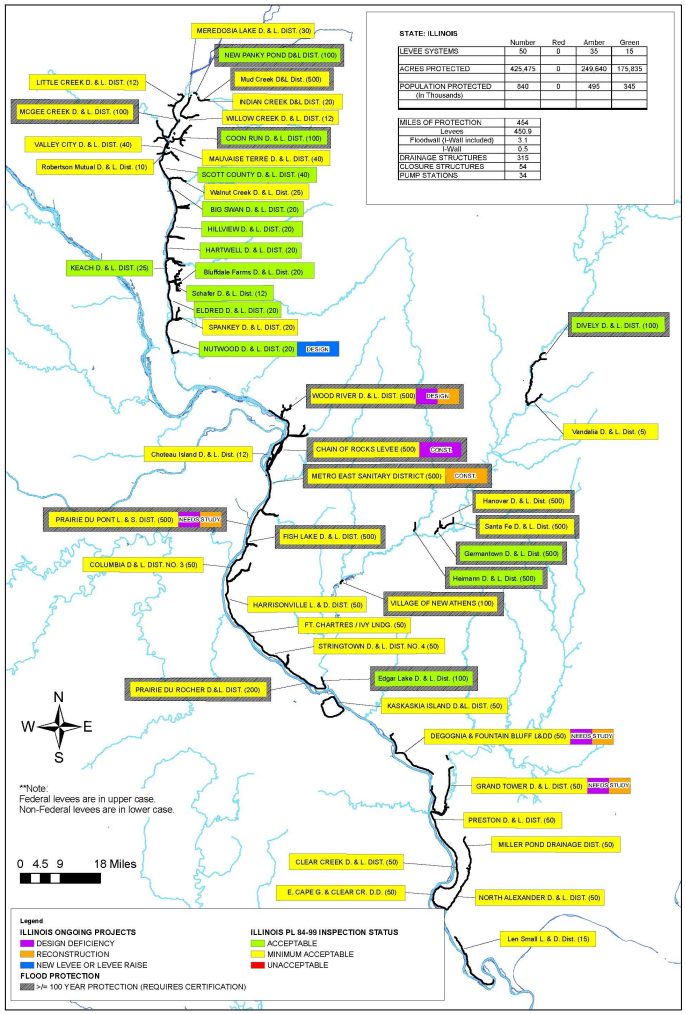
Illinois Levee Systems

ST. LOUIS DISTRICT - ILLINOIS LEVEE MAP


MEREDOSIA LAKE D. & L. DIST. (30)
NEW PANKY POND D&L DIST. (100)
LITTLE CREEK D. & L. DIST. (12)
Mud Creek D&L Dist. (500)
MCGEE CREEK D. & L. DIST. (100)
INDIAN CREEK D&L DIST. (20)
WILLOW CREEK D. & L. DIST. (12)
VALLEY CITY D. & L. DIST. (40)
COON RUN D. & L. DIST. (100)
Robertson Mutual D. & L. Dist. (10)
MAUVAISE TERRE D. & L. DIST. (40)
SCOTT COUNTY D. & L. DIST. (40)
Walnut Creek D. & L. Dist. (25)
BIG SWAN D. & L. DIST. (20)
HILLVIEW D. & L. DIST. (20)
HARTWELL D. & L. DIST. (20)
KEACH D. & L. DIST. (25)
Bluffdale Farms D. & L. Dist. (20)
Schafer D. & L. Dist. (12)
ELDRED D. & L. DIST. (20)
SPANKEY D. & L. DIST. (20)
NUTWOOD D. & L. DIST. (20) DESIGN
DIVELY D. & L. DIST. (100)
WOOD RIVER D. & L. DIST. (500) DESIGN
Vandalia D. & L. Dist. (5)
Choteau Island D. & L. Dist. (12)
CHAIN OF ROCKS LEVEE (500) CONST
METRO EAST SANITARY DISTRICT (500) CONST
Hanover D. & L. Dist. (500)
PRAIRIE DU PONT L. & S. DIST. (500) NEEDS STUDY
Santa Fe D. & L. Dist. (500)
FISH LAKE D. & L. DIST. (500)
Germantown D. & L. Dist. (500)
COLUMBIA D & L. DIST. NO. 3 (50)
Heimann D. & L. Dist. (500)
HARRISONVILLE L. & D. DIST. (50)
VILLAGE OF NEW ATHENS (100)
FT. CHARTRES / IVY LNDG. (50)
STRINGTOWN D. & L. DIST. NO. 4 (50)
Edgar Lake D. & L. Dist. (100)
PRAIRIE DU ROCHER D.&L. DIST. (200)
KASKASKIA ISLAND D.&L. DIST. (50)
DEGOGNIA & FOUNTAIN BLUFF L&DD (50) NEEDS STUDY
GRAND TOWER D. & L. DIST. (50) NEEDS STUDY
PRESTON D. & L. DIST. (50)
MILLER POND DRAINAGE DIST. (50)
CLEAR CREEK D. & L. DIST. (50)
E. CAPE G. & CLEAR CR. D.D. (50)
NORTH ALEXANDER D. & L. DIST. (50)
Len Small L. & D. Dist. (15)
STATE: ILLINOIS
Number Red Amber Green
LEVEE SYSTEMS 50 0 35 15
ACRES PROTECTED 425,475 0 249,640 175,835
POPULATION PROTECTED (In Thousands) 840 0 495 345
MILES OF PROTECTION 454
Levees 450.9
Floodwall (I-Wall included) 3.1
I-Wall 0.5
DRAINAGE STRUCTURES 315
CLOSURE STRUCTURES 54
PUMP STATIONS 34
N
W E
S
**Note:
Federal levees are in upper case.
Non-Federal levees are in lower case.
0 4.5 9 18 Miles
Legend
ILLINOIS ONGOING PROJECTS
DESIGN DEFICIENCY
RECONSTRUCTION
NEW LEVEE OR LEVEE RAISE
FLOOD PROTECTION
>/= 100 YEAR PROTECTION (REQUIRES CERTIFICATION)
ILLINOIS PL 84-99 INSPECTION STATUS
ACCEPTABLE
MINIMUM ACCEPTABLE
UNACCEPTABLE

P.O.C. : JAKE SCANLON 314-331-8569
AS OF: 07-19-07

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Illinois Levee Systems

- 50 Levee systems
  - 17 > 100 year
  - 33 < 100 year

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100 Year Flood?

- "100 Year Flood" is the flood that has a 1% chance of occurring in any given year.
- A 1% chance of flooding in any given year equates to a 26% chance of flooding over the life of a 30-year mortgage.
- A 1% chance of flooding in a given year equates to a 33% chance of flooding during the 40 year career of my new hydraulic engineer.
- A 1% chance of flooding in a given year equates to a 63% chance of flooding over the next 100 years.

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Levee Systems Interdependencies

- Levees should be looked at as systems.
- The performance of one levee can impact a downstream levee.

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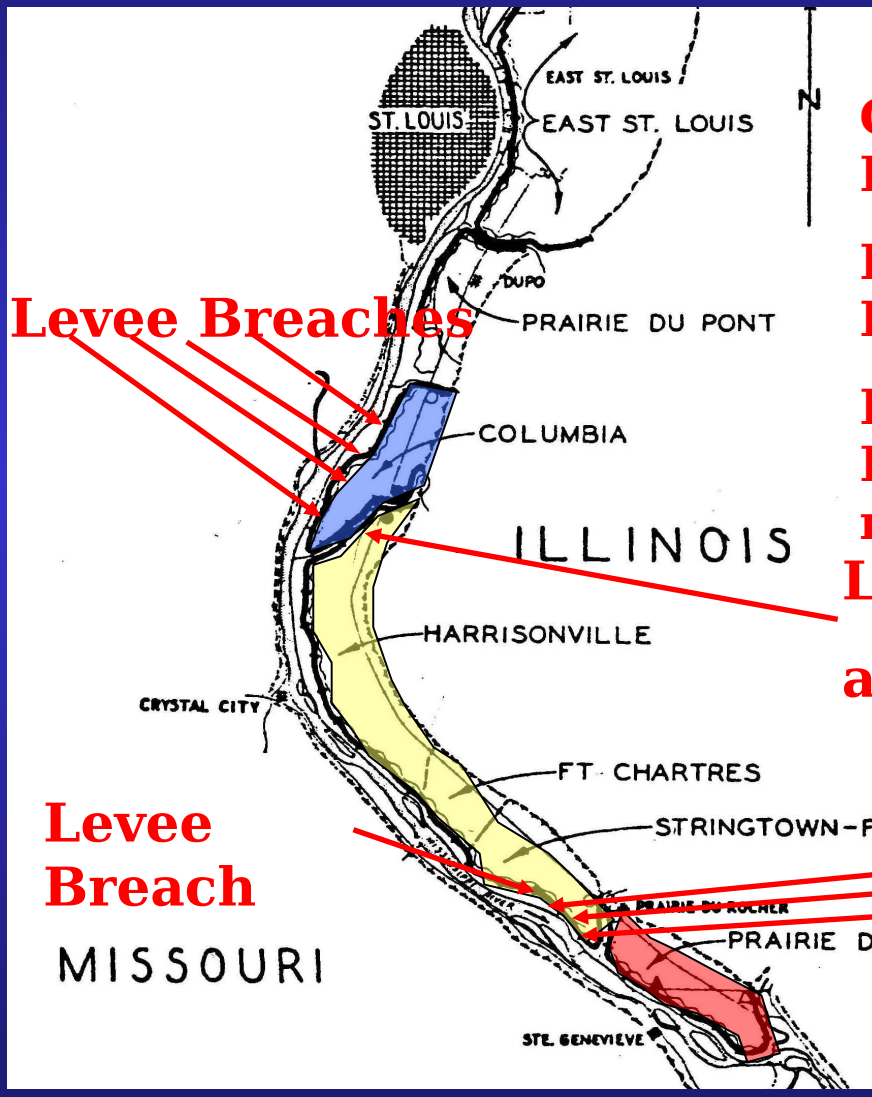
Levee Systems Interdependencies Demonstrated During the 1993 Flood



Levee Breaches

Columbia – 11 Breaches (4 River Front and 7 Flank Levee)

Harrisonville – 1 Breach (Flank Levee)

Ft. Chartres – 4 Breaches (River Front - 3 man-made breaches and 1 natural)

Levee Breaches (both Columbia and Harrisonville Levee Districts)

Levee Breach

3 Man-made Breaches

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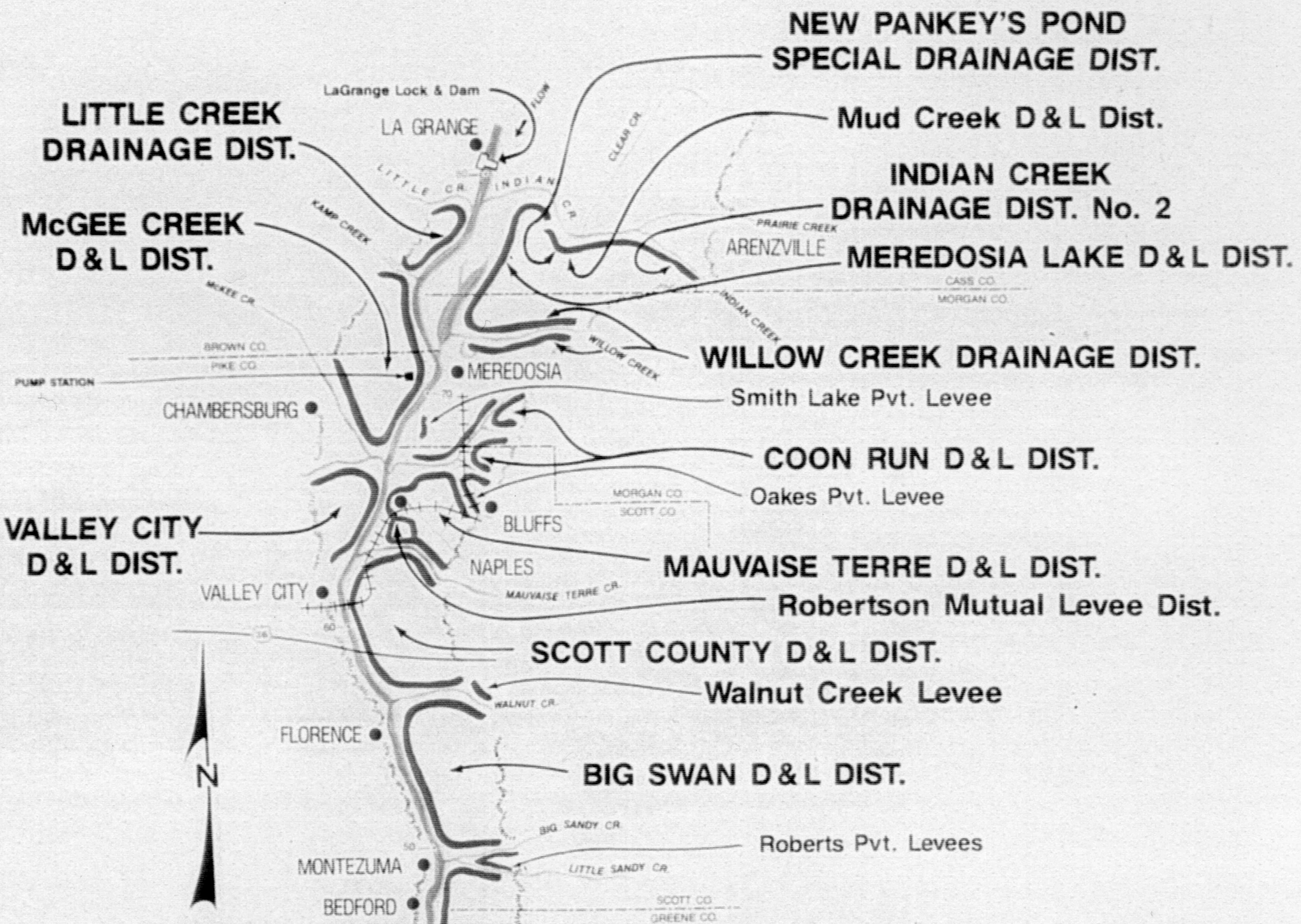
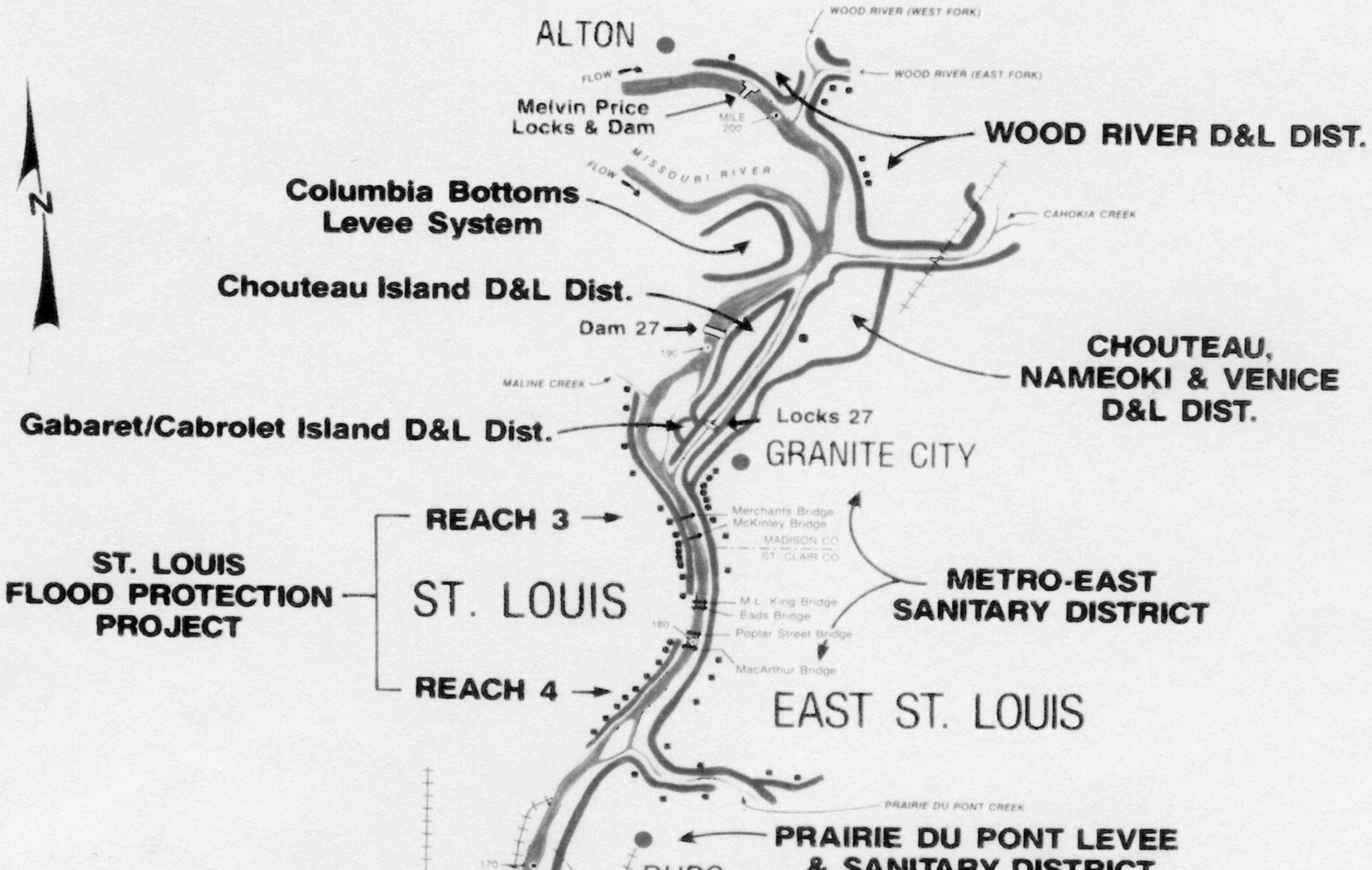
Illinois River Levee Systems



Mississippi River Levee Systems
Wood River D&LD To Prairie Du Rocher D&LD



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Potential Impacts

- Highways
- Bridges
- Railroads
- Fiber optic communication
- Hospitals

➢ Regional and national economics

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Will the levee perform?

- Levee Height
- Levee Maintenance
- Levee and Foundation Condition
- Past History
  - 1993/95 floods
  - Flood fighting

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Levee Height

- Design heights are based on flood flow frequency analyses and period of record.
- Settlement of the levee embankment.
- All Illinois levees have adequate height to meet their original authorization levels.

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Levee Maintenance

- Maintain erosion resistant grass turf 2” to 12” high.
- No trees or woody vegetation on or within 15 feet of levee.
- No animal burrows or tunnels in levee embankments.
- No ruts or depression on levee crown and slopes.
- No utility poles or structures in levee embankments.
- Steel gates painted to protect against corrosion.
- Flood gate components functional and well maintained.
- Drainage structure gates and operators aligned and greased.
- Drainage pipes are inspected, evaluated, lined or replaced when needed.

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Public Law 84-99 Annual Inspection

- All Illinois levees in the St. Louis District have an acceptable or minimally acceptable rating.
- Many of the Illinois levees received a minimally acceptable rating due to trees in the levee or too close to the levee toe.
- Steps to dealing with tree issue:
  - The Corps of Engineers inspection team (PL84-99) makes a preliminary assessment if the trees may be a problem.
  - A “tree team” then is sent to make a technical assessment to see if tree is a hazard and if it is how they can be removed in an environmentally acceptable manner.
  - No levee will receive an unacceptable rating for trees if they are making an effort to remove those trees identified by the Corps within two years.

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Levee and Foundation Condition

- **Uncontrolled Seepage** causes sand boils and loss of foundation materials under the levee.
- **Deteriorating Corrugated Metal Drain Pipes** allows loss of foundation materials under the levee.
- **Pipe Joints Separating** allows loss of foundation materials under the levee.
- **Corroding Steel Floodgates and Valves** allows uncontrolled flood waters into the protected area.
- **Structural Instability** causes sliding and rotation of the embankment or structure and loss of protection.
- **Insufficient Levee Height** results in a lack of protection.
- **Trees** on or too close to the levee can cause a problem.

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Past History

- All “100-Year” or greater levees passed the 1993 Flood
- All Illinois levee districts within the St. Louis District either held back the flood or exceeded their design flood elevations before they overtopped or breached.
- Generally the levees underperformed due to underseepage and drainage pipe failures.

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Kaskaskia Island D&LD Uncontrolled Seepage July 1993 Flood

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Kaskaskia Island Breach On July 22, 1993

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Kaskaskia Island D&LD Failure Uncontrolled Seepage July 1993 Flood

St. Louis Flood Protection

Uncontrolled Seepage Flows From Under The Floodwall
July 1993

St. Louis Flood Protection

Uncontrolled Seepage Flows From Under The Floodwall
July 1993

Wood River D&LD
Deteriorating Riverside CMP Gravity Drain 2005

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Grand Tower D&LD

Two Deteriorating CMP Gravity Drains, July 2002
Sta 473+12 Top Photos & Sta 501+76 Bottom Photos

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After 1993/1995 floods

- D&LDs came to the Corps of Engineers concerned with what was seen as underperformance issues.
- Studies were funded by the Congress

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Illinois Levee Systems

The Corps of Engineers based on studies completed does not have the required level of confidence that the following urban protection levees could pass the “100-year” event without flood fighting.

- **Wood River**
- **Chain of Rocks**
- **East St. Louis & Vicinity**
- **Prairie Du Pont**
- **Fish Lake**

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Results of studies

- **Wood River D&LD** - Inadequate seepage controls and deteriorating corrugated metal pipes (CMP).
- **E. St. Louis D&LD** - Inadequate seepage controls and deteriorating corrugated metal pipes (CMP).
- **Chain of Rocks Canal East Levee** - Inadequate seepage controls.
- **Prairie Du Pont D&LD** - Inadequate seepage controls and deteriorating corrugated metal pipes (CMP).
- **Fish Lake D&LD** - Inadequate seepage controls and deteriorating corrugated metal pipes (CMP).

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Status of Fix

- **Chain of Rocks** Canal Design Deficiency Report –Approved, funding requested, under construction.
- Limited Reevaluation Report **Wood River** Levee System Reconstruction Project – Relief wells approved and funding requested, remaining features pending approval
- **Prairie Du Pont – Fish Lake** Flood Protection Project Section 905(b) (WRDA 96) Analysis – Pending approval
- **East St. Louis and Vicinity** General Design Memorandum Supplement – Pending completion

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Perspective

- We have systems that worked in the past.
- We have an aging system.
- We have systems both urban and rural that have underperformance issues.
- We are challenged by a constrained federal budget.
- A regional approach may be the best path forward.

- We need to work together to assess, communicate and solve.
- Let us use this conference to influence the future.